

# FUNDING PROGRAM FOR NEXT GENERATION WORLD-LEADING RESEARCHERS

**Project Title:** Elucidation of novel machinery for signal transduction and mechanisms underlying inflammation and autoimmune diseases due to impairment of the machinery

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## 1. Background of research

Appropriate immune response and inflammation are required for protection against bacteria and viruses. However, recent reports have shown that excessive immune response and inflammation result in not only fever, pollen allergy, asthma, but also cancer, arteriosclerosis, and Alzheimer's disease. Therefore, the regulation and inhibition of the excessive immune response and inflammation are critical for the therapy of pollen allergy as a national malady and various lifestyle-related diseases, but such a therapeutic drug has not been found yet.

## 2. Research objectives

The objective of this study is the development of new types of therapeutic drugs for immune diseases and inflammation, which suppress only excessive inflammation and anybody can take safely without side effects. By using our original studying techniques, we would like to reveal precise functions of various immune molecules and discover the targets of epoch-making therapeutic drugs for pollen allergy and cancer, which are caused by dysregulation of immunity and inflammation.

## 3. Research characteristics (incl. originality and creativity)

We found that various immune molecules develop precise functions, not as a single molecule, but in the multimeric complex. The originality of this study is based on our idea to discover the pathogenesis of various immune diseases and cancer and their optimal targets of therapeutic drugs, through elucidation of precise functions of various immune molecules in the multimeric complex.

## 4. Anticipated effects and future applications of research

This studying strategy based on our new idea leads to the discovery of effective therapeutic targets, the development of therapeutic drugs for diseases without an effective cure, including pollen allergy and cancer, and the relief of drug side effects, such as infection susceptibility by immunosuppressant in organ transplantation. Furthermore, optimal and effective personalized medicine is realized by the selection of suitable therapeutic targets and drugs developed in this study, depending on types and characteristics of immune diseases.

# ● Research objectives

Discovery of the targets of therapeutic drugs by elucidation of mechanisms of excessive immune response and precise functions of immune molecules.

Development of therapeutic drugs, which suppress only excessive immune response and inflammation.

Immune response and Inflammation

Appropriate

- Protection against bacteria and viruses

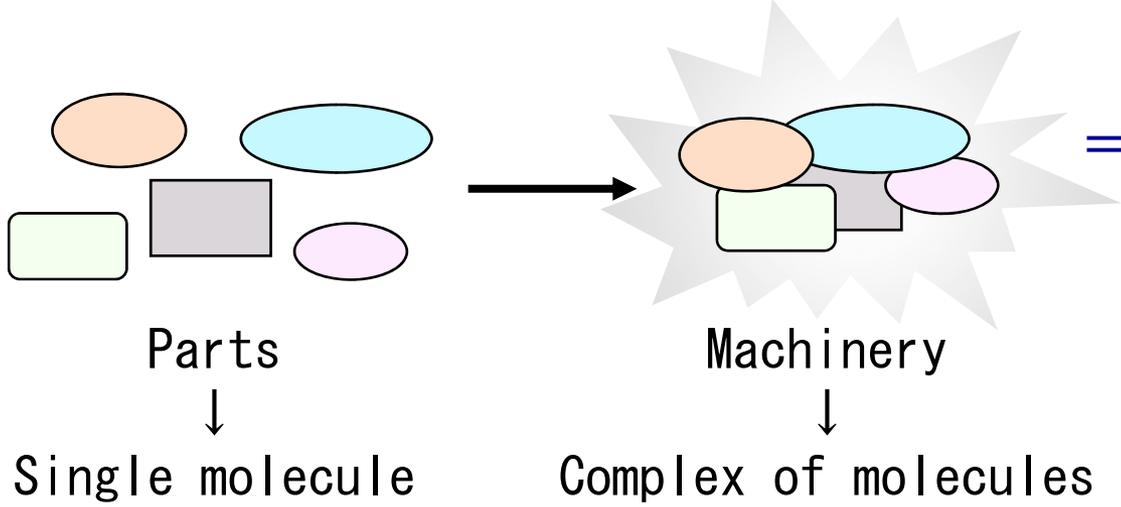


Excessive

- Pollen allergy
- Asthma
- Cancer (Hepatitis virus, Cigarette, Helicobacter pylori)
- Ischemic brain injury and heart disease (Arteriosclerosis)
- Alzheimer's disease

# ● Research characteristics

## From Parts To Machinery



= Development of  
Precise functions

The complex of various immune molecules functions as an information-processing equipment, which is important for the immune system, including sensing of pathogens, intracellular signal transduction, assembly and multibranch of information, and induction of various immune responses.

**Elucidation of precise functions of immune molecules, not as a single molecule, but in the multimeric complex.**

**Discovery of pathogenesis and therapeutic targets of immune diseases and cancer, by identification and functional analysis of components in the complex.**